COMPUTER USE AT LUCKY PEAK NURSERY[1/]

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Abstract.--After almost a years operational use of the Nursery Management Information System, Lucky Peak Nursery has found the computer system a valuable tool. NMIS is designed for use by the nursery personnel with little or no background in computer operations. Use of the available programs has significantly reduced work hours involved in data storage and computation.

Prior to the Nursery Management Information System (NMIS), all records for our 600+ seed sources and 300+ seedling lots were kept by hand on various cards records, and forms located in at least 4 different places in the nursery office Seedling shipping volume at Lucky Peak is between 5mm and 6mm a year. Every major activity on seed and seedlings was recorded, from the yearly inventory of seed to the shipping of seedlings. A lot of time was spent recording the data to the various cards, etc.

As a nursery manager, I was looking for help in being more efficient in data storage and retrieval. Help was also needed to answer some of those strange questions that come down the chain-of-command--how much Douglas-fir seed was collected in 1974 at 5000' elevation on the Payette National Forest, how much Jeffrey pine was sown at the nursery in 1979, what did you send me in 1974. The list goes on and on--you know what I'm talking about. Requests like these would cause a great deal of teeth-gritting, thinking about all the time and running to get the data.

Thats where we were, now where are we?

On a cold gray morning in January 1981, the last box containing the computer hardware was opened. That was the day we started as a pilot nursery for the Forest Service's Nursery Management Information System program. Our job was to locate "bugs" in the programs, make recommendations for changes and modifications, and see if we could service and be compatible with the computer. By August, the sun was shinning and we could talk about NMIS without using a lot of expletive adjectives!

Since last August, all data for all seed lots has been put on the seed program. All data for last years 2-0 and this years 1-0 and 2-0 has been put on the seedling program. A seed and seedling history report located in the exhibits shows the data we are recording and how the format looks. These history reports contain all the data we are recording; the beauty of the program is the flexibility and speed which data can be applied and retrieved.

As a manager, the bottom line is "how cost effective is it?" Our system is composed of a Texas Instruments 990 CTR, two Texas Instruments FD1000 disc drive units, and a Texas Instruments OMNI printer - total cost about $14,000.00. All hardware is the same at the ten Forest Service Nurseries using NMIS. We did not hire a computer technician to operate the programs--the programs are clear enough that we utilize nursery workers as operators. Cost effectiveness is both tangible and intangible. (see Table 1)

1/ Presented to the meeting of the Southern Nursery Conference (Eastern Session), Savannah, Georgia, July 12-15, 1982

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TABLE 1

Activity	Recording Time	
	NMIS	Card File
Apply one cultural activity to 40 sources in one field	2 minutes	25 minutes
Apply daily pack by source	30 sec./source	15 sec./source
Apply 5 cultural activities to 40 sources in one field all one level	3 minutes	60 minutes
Apply seed test data for one seed source	30 seconds	30 seconds
Report of seed not tested within last three years	8 minutes	80 minutes
Report of seedlings delivered in order by date and customer	14 minutes	120 minutes
	printed	Legibility?

We had three programs developed for us by the computer section in our Supervisor's Office. These programs were: 1. Inventory computation, 2. Shoot and caliper means and Standard Deviation, and 3. Sowing calculations. (see Exhibits)

The sowing program enabled us to compute the sowing schedule in 1½ days; by hand it would have taken 4 days. At this time there is no cross-over from NMIS to the sowing program.

The inventory and size calculation determination in the past was done by the inventory crews, a fistful of calculators, and about 5 weeks time. Each crew would do the calculations for their field work each day. This would be about 30% of their time each day on calculations. Last summer, with the computer program, one crew could input all the data from one days field work in about 3 hours. Total inventory work last year took 3 weeks for about the same volume of trees as the year before. We felt we cut inventory cost by 380 work hours.

The more seed and seedling lots you have, the more cost efficient the computer becomes.

One of the main disadvantages of the computer is the feeling of panic when a breakdown in the equipment occurs. We experienced head adjustment problems on one of the disk drive units 3 times in five months. Repair required sending the faulty unit to California for 3 to 5 weeks. The last breakdown was handled by our forest computer specialist in two days. Even though good procedures include making a "back-up" data disk after each input session (so you don't lose data if your main data disk is damaged), the mere fact of machine malfunction prohibiting you from seeing your data when you want is a chilling feeling.

There is interest in developing at least two more programs for NMIS. We need a program to apply all soil maintenance activities, and a program to record all cone and seed processing activities. Hopefully our Forest Service programmers in Ft. Collins, Colorado will work on these programs.

In closing I would say that the computer-age has come to Lucky Peak Nursery. When all the frustrations, malfunctions, and costs are compared to increased efficiency, rapid report generation, and unlimited programming potential, a nursery computer system is a valuable tool for the nursery manager.

LUCKY PEAK NURSERY

SEED LOT ID	ORIG DATE	SPECIE	R E G	F O R	D I S T	BREED ZONE	GEN BASE	HABIT CODE	SEED ZONE	ELEV	COLLECTION Y E A R	M E T H	T Y P E	SOIL TYPE	CERT CODE	SUB LOT	STORED FOR	INITIAL AMOUNT STORED	EXTRACT CODE	STORE LOC	TOWN SECTION
PP02 71003	120271	PIPO	04	02	X	0				5.5	71		100			02		508.0		3	LOGGING GULCH

********** SEED TEST **********

TYPE OF TEST	241	241
TEST NUMBER	006486	041093
TEST DATE	0877	0680
UNIT OF WT	P	P
GROSS SEED/UNIT WT.		9700
PERCENT PURITY		99
PERCENT FILLED		0
VIABLE SEED/UNIT WT.		8546
PCT MOIST CONTENT		6.
NUMBER DAYS STRATIFIED		28
DAYS UNSTRAT (CATAGORY)	7	7
PCT	0	0
DAYS STRAT	7	7
STRAT PCT	27	58
DAYS UNSTRAT (CATAGORY)	14	14
PCT	13	9
DAYS STRAT	14	14
STRAT PCT	80	80
DAYS UNSTRAT (CATAGORY)	21	21
PCT	24	21
DAYS STRAT	21	21
STRAT PCT	83	88
DAYS UNSTRAT (CATAGORY)	28	28
PCT	46	50
DAYS STRAT	28	28
STRAT PCT	86	89
DAYS UNSTRAT (CATAGORY)	35	35
PCT	63	53
DAYS STRAT	35	0
STRAT PCT	88	0
SURVIVAL FACTOR		85
NURSERY FACTOR		15
SEEDLING/UNIT BARE ROOT		7264
SEEDLING/UNIT CONTAINER		0

SEED HISTORY REPORT
RUN DATE
07/01/82

LUCKY PEAK NURSERY

SEED HISTORY REPORT
RUN DATE 07/01/82

SEED LOT ID	DATE MMDDYY	ACT CODE	ACTIVITY NAME	UNIT WT.	BEGINNING AMOUNT	AMOUNT INVOLVED	ENDING AMOUNT	BILLING NUMBER	PURCHASE ORDER NO	COST/WT
PP02 71003	012182	236	NURSERY SOWING	P	411.3	30.0	381.3			
PP02 71003	012082	243	INVENTORY	P	410.8	411.3	411.30			
PP02 71003	042281	241	TEST	P	410.8	.05	410.8		UTAH STATE NURS.	
PP02 71003	031181	236	NURSERY SOWING	P	445.8	35.0	410.8			
PP02 71003	031980	243	INVENTORY	P	442.8	445.8	445.8			
PP02 71003	031080	236	NURSERY SOWING	P	501.8	59.0	442.8			
PP02 71003	030979	236	NURSERY SOWING	P	618.3	116.5	501.8			
PP02 71003	030279	236	NURSERY SOWING	P	642.0	23.7	618.3		HERBICIDE STUDY	
PP02 71003	013079	230	SEED TRANSACTIONS	P	643.0	1.0	642.0		P.T. TEST	
PP02 71003	021478	236	NURSERY SOWING	P	648.5	5.5	643.0		HERBICIDE STUDY	
PP02 71003	011678	236	NURSERY SOWING	S	971.5	323.5	648.5			
PP02 71003	050977	243	INVENTORY	P	971.5	971.5	971.5			
PP02 71003	032977	236	NURSERY SOWING	P	977.0	5.5	971.5		HERBICIDE STUDY	
PP02 71003	032777	236	NURSERY SOWING	P	1028.0	51.0	977.0			
PP02 71003	021577	236	NURSERY SOWING	P	1210.0	182.0	1028.0			
PP02 71003	101376	232	DONATE	P	1225.0	15.0	1210.0		I.F.&RES.	
PP02 71003	040676	232	DONATE	P	1225.0	.22	1225.0		U. I.	
PP02 71003	040576	236	NURSERY SOWING	P	1258.0	33.5	1225.0			
PP02 71003	111274	236	NURSERY SOWING	P	1265.0	6.5	1258.0			
PP02 71003	040874	243	INVENTORY	0	1266.0	1265.0	1265.0			
PP02 71003	032674	236	NURSERY SOWING	P	1577.0	311.0	1266.0			
PP02 71003	071333	238	MIXED SOURCES	P	374.0	1203.0	1577.0		COMBINE 7 LOTS	
PP02 71003	091972	237	DIRECT SOWING	P	375.0	1.0	374.0		DIRECT SOW 0206	
PP02 71003	031072	236	NURSERY SOWING	P	508.0	133.0	375.0			
PP02 71003	110971	240	SEED STORAGE	P		508.0	508.0			

SEEDLING HISTORY REPORT

RUN DATE 07/01/82 PAGE 1 A

SEED IDENTIFICATION				ORDERING INFORMATION		SEED TEST		GERMINATION		SOWING INFORMATION	
SEEDLING LOT ID	8202 71003	REGION	04	GROWN FOR	04-02	TEST TYPE	241	STRATIFIED TEST			
ORIGINATION		FOREST	02	YEAR DESIRED	82	TEST		DAYS/PCT 7	/58	EST SURVIVAL	
DATE	120079	DISTRICT		TREES		NUMBER	041093	DAYS/PCT 14	/80	PER CENT	85
				ORDERED	325	TEST DATE	0680	DAYS/PCT 21	/88	NURSERY FACTOR	15
				STOCK TYPE	B	UNIT OF		DAYS/PCT 28	/89	UNIT OF WEIGHT	P
SPECIES	PIPO	YEAR		AGE CLASS		WEIGHT	P	DAYS/PCT 0	/0	UNIT OF LENGTH	F
BREEDING		COLLECTED	71	DESIRED	2.0	GROSS SEED				AMOUNT TO SOW	59
ZONE		METHOD				UNIT WT	9700	UNSTRATIFIED TEST		DENSITY DESIRED	25
GENETIC		COLLECTION		MINIMUM STOCK		PER CENT		OR (CATAGORY)		SEED TO DROP	
BASE		TYPE		HEIGHT	0	PURITY	99	DAYS(CAT)/PCT 7	/0	PER SQ. UNIT	38
HABITAT		COLLECTION		MINIMUM STOCK		PER CENT		DAYS(CAT)/PCT 14	/9	SEED DRILL	LOVE
CODE				CALIPER	0	FILLED SEED	0	DAYS(CAT)/PCT 21	/21	DRILL SETTING	3-2
SEED ZONE				MINIMUM SHOOT		VIABLE SEED		DAYS(CAT)/PCT 28	/50	TURNS PAST MARK	10
ELEVATION	5.5			ROOT RATIO	0	UNIT WT.	7692	DAYS(CAT)/PCT 35	/93	INPUT GEAR	
						PER CENT				OUTPUT GEAR	
SOIL TYPE	100			MAXIMUM STOCK		MOISTURE				CALCULATED	
CERT CODE				HEIGHT	0	NUMBER DAYS				LENGTH	4402
SUBLOT				MAXIMUM STOCK		STRATIFIED	28			ACTUAL LENGTH	5203
NUMBER				CALIPER	0					AMOUNT SOWN	59.0
NURSERY ID	88			MAXIMUM SHOOT						NUMBER DAYS	
RANGE/TOWN/SECTION	RED CANYON			ROOT RATIO	0					STRATIFIED	31

SEEDLING LOT ID	DATE MMDDYY	INVENTORY CODE	NAME	TREE AGE	GROSS TREES	NET TREES	AVG HT	AVG CAL	CUL PCT	LENGTH UNIT	DENSITY SQ UNIT	STD DEV	LOT LENGTH
				INVENTORY									
8202 71003	070081	422	SEED LOT INVENTORY	2.0	311	260	11.	4.5	17	F	17	5.1	5203
8202 71003	080080	412	SEED LOT INVENTORY	1.0	297	218			27	F	16	0	5203

LUCKY PEAK NURSERY

SEEDLING HISTORY REPORT
RUN DATE 07/01/82 PAGE 1 B

STOCK TRANSACTIONS

SEEDLING LOT ID	DATE MMDDYY	*ACTIVITY* CODE	NAME	TREE AGE	NUMBER TREES (M)	TEMP (C)	P-M STRESS	BILLING NUMBER	PURCHASE ORDER NO
8202 71003	041982	551	PICK UP	2-0	103.75				LOWMAN
8202 71003	040882	551	PICK UP	2.0	51.2				IDAHO CITY
8202 71003	040182	551	PICK UP	2.0	89.27				LOWMAN
8202 71003	033082	551	PICK UP	2.0	8.9				CASCADE
8202 71003	031782	520	PACKING	2.0	33.73				
8202 71003	031782	510	LIFTING	2.0					ALL
8202 71003	031682	510	LIFTING	2.0					4-3 4-5-1-2
8202 71003	031682	520	PACKING	2.0	224.57				

LUCKY PEAK NURSERY

SEEDLING HISTORY REPORT
RUN DATE 07/01/82

SOWING LOCATIONS

SEEDLING LOT ID	FIELD	UNIT	BED	SOWING LOCATION	LENGTH UNIT	LENGTH SOWN
8202 71003	4	5	4	N230	F	230
8202 71003	4	5	3		F	413
8202 71003	4	5	2		F	413
8202 71003	4	5	1		F	413
8202 71003	4	4	5		F	413
8202 71003	4	4	4		F	413
8202 71003	4	4	3		F	413
8202 71003	4	4	2		F	413
8202 71003	4	4	1		F	413
8202 71003	4	3	5		F	414
8202 71003	4	3	4		F	414
8202 71003	4	3	3		F	414
8202 71003	4	3	2		F	414
8202 71003	4	3	1	N-13	F	13

CULTURAL TREATMENTS

SEEDLING LOT ID	FIELD	UNIT	BED	DATE MMDDYY	*ACTIVITY* CODE	NAME	ACTIVITY METHOD	ACTIVITY RATE
8202 71003	4			091581	342	SOIL	21-0-0	100#/AC
8202 71003	4			052681	352	ROOT HORIZONTAL		9"
8202 71003	4			051281	353	ROOT VERTICAL		6"
8202 71003	4			043081	392	PESTICIDE APPLIED	BIFENOX #229	3#AI/AC
8202 71003	4			100880	342	SOIL	6-2-0	1000#/AC
8202 71003	4			090280	342	SOIL	6-2-0	500#/AC
8202 71003	4			061080	392	PESTICIDE APPLIED	DACTHOL #230	10.5#AI/AC
8202 71003	4			041780	392	PESTICIDE APPLIED	DYMID #231	6#AI/AC
8202 71003	4			041780	270	SOWING	SOWING	
8202 71003	4			090079	121	PLASTIC SEAL	#113	350#/AC
8202 71003	4			080079	154	RIPPING	N-S E-W DEEP RIP	36"
8202 71003	4			050079	141	COVER CROP	SAWDUST	2"
8202 71003	4	5	4	060380	342	SOIL	6-2-0	400#/AC

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NMIS  Seed Subsystem  Version 2.3.0   Dist. date 06/01/82

MASTER MENU

ENTER FUNCTION YOU WISH TO PERFORM

1. DATA RETRIEVAL/MODIFICATION/DELETION
2. DATA ENTRY (ADD NEW ENTRIES FOR ALL DATA SUBSETS)
3. DATA ENTRY (ADD NEW ENTRIES FOR A DATA SUBSET)
4. FILE STATISTICS
5. REPORT GENERATION
6. COMPRESSION OF DATA SET
7. BACK-UP OF DATA SET OR SYSTEM DISKETTE
8. NMIS SYSTEM UTILITIES
9. T.I SYSTEM UTILITIES

ENTER THE NUMBER CORRESPONDING TO YOUR CHOICE 5



REPORT SELECTION MENU

0. INFORMATION ON SELECTING AND SORTING REPORTS
1. SEED ACTIVITY SUMMARY
2. SEED HISTORY REPORT
3. SEED HISTORY REPORT - SEED TEST ONLY
4. SEED HISTORY REPORT - SEED ACTIVITY ONLY
5. SEED CODE INFO LISTING
6. SEED CODE REPORT
7. SEED ACTIVITY REPORT
8. SEED BOOK INVENTORY
9. SEED BOOK INVENTORY (LOT)
10. SEED BOOK INVENTORY (SEED CODE)

ENTER NUMBER CORRESPONDING TO REPORT YOU WISH TO RUN
AND 'RETURN' OR 'ESC' AND 'RETURN' TO RETURN TO -MAIN MENU-:
```

```
*****************************************************************************
*                          NURSERY MANAGEMENT                               *
*                            SEED CODE INFO                                 *
*                         REPORT DATA SELECTION                             *
*****************************************************************************
*        SEED LOT ID # _ _          ORIGINATION DATE _ _                    *
*             SPECIES _ _                   REGION _ _                      *
*              FOREST _ _                 DISTRICT _ _                      *
*        BREEDING ZONE _ _            GENETIC BASE _ _                      *
*         HABITAT CODE _ _              SEED ZONE _ _                      *
*           ELEVATION _ _            YEAR COLLECTED _ _                    *
*      METHOD COLLECTED _ _        TYPE OF COLLECTION _ _                   *
*           SOIL TYPE _ _               CERT. CODE _ _                      *
*        SUBLOT NUMBER _ _              STORED FOR _ _                      *
*          UNIT OF WT _ _              AMT. STORED _ _                      *
*       EXTRACTORY CODE _ _         STORAGE LOCATION _ _                    *
* TOWNSHIP/RANGE/SECTION _ _                                                *
*                                                                           *
*                                                                           *
*                                                                           *
*                                                                           *
*****************************************************************************
 1st '_' IS FOR SORT KEY. 2nd '_' IS SELECTION KEY
```

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NMIS  Seedling Subsystem  Version 2.2.2  Dist. date 02/01/82

MASTER MENU

ENTER FUNCTION YOU WISH TO PERFORM

1. DATA RETRIEVAL/MODIFICATION/DELETION
2. DATA ENTRY (ADD NEW ENTRIES FOR ALL DATA SUBSETS)
3. DATA ENTRY (ADD NEW ENTRIES FOR A DATA SUBSET)
4. FILE STATISTICS
5. REPORT GENERATION
6. COMPRESSION OF DATA SET
7. BACK-UP OF DATA SET OR SYSTEM DISKETTE
8. NMIS SYSTEM UTILITIES
9. T.I SYSTEM UTILITIES

ENTER THE NUMBER CORRESPONDING TO YOUR CHOICE 5



 REPORT SELECTION MENU

 0. INFORMATION ON SELECTING AND SORTING REPORTS
 1. SEEDLING HISTORY REPORT
 2. SEEDLING HISTORY REPORT-PAGE A ONLY
 3. SEEDLING HISTORY REPORT - STOCK TRANSACTIONS ONLY
 4. SEEDLING HISTORY REPORT - CULTURAL TREATMENTS ONLY
 5. INVENTORY ACTIVITY REPORT
 6. STOCK TRANSACTIONS ACTIVITY REPORT
 7. CULTURAL TREATMENTS ACTIVITY REPORT
 8. ORDERING INFO LISTING

 ENTER NUMBER CORRESPONDING TO REPORT YOU WISH TO RUN
 AND 'RETURN' OR 'ESC' AND 'RETURN' TO RETURN TO -MAIN MENU-:
```

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*****************************************************************************
*                          NURSERY MANAGEMENT                               *
*                           SEEDLING LOT INFO                               *
*                        REPORT DATA SELECTION                              *
*****************************************************************************
*     SEEDLING LOT ID # _ _          ORIGINATION DATE _ _                   *
*              SPECIES _ _                   REGION _ _                     *
*               FOREST _ _                 DISTRICT _ _                    *
*        BREEDING ZONE _ _              GENETIC BASE _ _                    *
*         HABITAT CODE _ _                 SEED ZONE _ _                    *
*            ELEVATION _ _             YEAR COLLECTED _ _                  *
*  METHOD OF COLLECTION _ _         TYPE OF COLLECTION _ _                  *
*            SOIL TYPE _ _                CERT. CODE _ _                    *
*        SUBLOT NUMBER _ _                NURSERY ID _ _                    *
*             RANGE/TOWNSHIP/SECTION _ _                                    *
*            GROWN FOR _ _                STOCK TYPE _ _                    *
*         YEAR DESIRED _ _          AGE CLASS DESIRED _ _                  *
*        TREES ORDERED _ _           MIN STOCK HEIGHT _ _                   *
*     MIN STOCK CALIPER _ _       MIN SHOOT ROOT RATIO _ _                  *
*      MAX STOCK HEIGHT _ _          MAX STOCK CALIPER _ _                  *
*  MAX SHOOT ROOT RATIO _ _                                                 *
*****************************************************************************
 1st '_' IS FOR SORT KEY. 2nd '_' IS SELECTION KEY
```

STOCK SIZE CALCULATION DATA FILE CREATION

THIS PROGRAM CREATES A DATA FILE FOR USE AS INPUT
TO THE STOCK SIZE CALCULATION PROGRAM.

PLEASE ENTER HEIGHT IN CENTIMETERS AND CALIPER
IN MILLIMETERS; FOR EXAMPLE, 25.4,4
ENTER 0,0 FOR LAST ENTRY.

INPUT HT.IN.CM, CAL.IN.MM: 1.5,3
INPUT HT.IN.CM, CAL.IN.MM: 4.5,2.5
INPUT HT.IN.CM, CAL.IN.MM: 5.7,3.5
INPUT HT.IN.CM, CAL.IN.MM: 10.8,2.8
INPUT HT.IN.CM, CAL.IN.MM: 12.2,4.5
INPUT HT.IN.CM, CAL.IN.MM: 12,3.58
INPUT HT.IN.CM, CAL.IN.MM: 7.5,2.5
INPUT HT.IN.CM, CAL.IN.MM: 8,5,2.75
INPUT HT.IN.CM, CAL.IN.MM: 9.5,2.75
INPUT HT.IN.CM, CAL.IN.MM: 10.8,3.25
INPUT HT.IN.CM, CAL.IN.MM: 0,0

SEEDLING ID IS: 8402675004

MEAN IS:
HT.IN.CM 8.3 CAL.IN.MM 3.13

STANDARD DEVIATION IS:
SD.HT 3.51125 SD.CAL .61473

% OF ENTRIES WITHIN ONE STANDARD DEVIATION OF THE MEAN IS:
HT.% 60 CAL.% 40

BED INVENTORY

SEEDLING ID IS: 8402675004
FIELD IS: 11
COMPARTMENT IS: 5
BED IS: 5
BED LENGTH IS: 402
CULL % IS: .18
PLOT COUNT (1) IS: 109
PLOT COUNT (2) IS: 140
PLOT COUNT (3) IS: 135
PLOT COUNT (4) IS: 125
PLOT COUNT (5) IS: 128
PLOT COUNT (6) IS: 139
PLOT COUNT (7) IS: 136
PLOT COUNT (8) IS: 135

FOR THE ABOVE SET OF DATA:
GROSS MEAN = 130.88
GROSS BED COUNT = 52613.76
NET BED VOLUME = 43143.28
NET MEAN = 107.32
DENSITY = 37.39

SOWING CALCULATIONS

ENTER SEEDLOT I.D. 84064750004
ENTER SEEDS PER POUND 15600
ENTER GERM (INCLUDE DECIMAL POINTS) .87
ENTER PURITY .98
ENTER SURVIVAL FACTOR .85
ENTER AMOUNT REQUESTED 30000
ENTER CULL FACTOR .25
ENTER SEEDLING DENSITY 25
VIABLE SEED PER LB. 11305
PLANNED PRODUCTION # 1 40000
SEED REQUIRED 3.538
10% OF SEED REQUIRED .354
ENTER THE AMOUNT OF SEED YOU WISH TO SOW 3.6
PLANNED PRODUCTION # 2 40698
TOTAL SQ. FT. 1628
TOTAL BED LENGTH 465
SEED DROP PER ROW FT. 17
TOTAL SOWN 30524
PRINT THIS DATA ON THE PRINTER
ANOTHER LOT? Y/N